

File

FILE COPY

O T T A W A

September 24, 1945.

R E P O R T

of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 1938.

Investigation of Defects in Aluminium Sand Castings.

(Copy No. 6.)

O T T A W A September 24, 1945.

R E P O R T

of the

ORE DRESSING AND METALLURGICAL LABORATORIES.

Investigation No. 1938.

Investigation of Defects in Aluminium Sand Castings.

=====

Origin of Material and Purpose of Investigation:

Four samples from aluminium-silicon sand castings were submitted by Mr. A. C. Boak, Consulting Metallurgical Engineer, Toronto, Ontario, on August 31, 1945. Two contained hard inclusions which had caused saw breakage. Two were localized surface depressions.

Spectrographic Analysis:

Spectrographic examination of the samples containing the inclusions showed the following results:

SPECTROGRAPHIC RESULTS

<u>Location</u>	<u>Silicon</u>	<u>Iron</u>	<u>Mangan- ese</u>	<u>Copper</u>	<u>Magne- sium</u>
		P e r	C e n t		
Sawn surface -	4	0.6	0.1*	0.1*	0.02
Inclusion -	6	0.8*	0.1*	0.1*	0.04
Fractured surface -	3.6	0.8	0.1*	0.1*	0.03

*Greater than, i.e., above standards.

These results, obtained from an unstandardized surface, are indicative only.

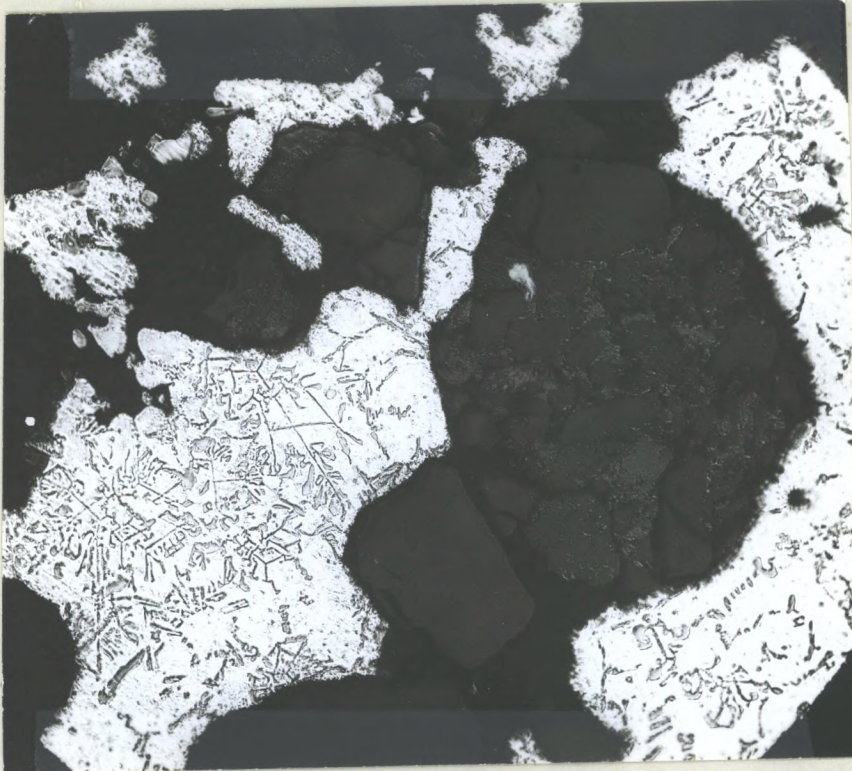
Microscopic Examination:

A sample containing an inclusion was polished and photographed (see Figure 1). The micrograph shows that the inclusion did not originate in the melt. The massive appearance and dissociated habit would indicate that the inclusion had been picked up during the melting operation but had not been wetted by the melt. Under polarized light the inclusion appeared to be of an alumina-silica type.

The surface defect is shown in Figure 2. Some sand grains are visible adhering to the surface of the casting. These were more apparent during the earlier stages of polishing.

(Figures 1 and 2 appear
on next page. Text
continues on Page 4.)

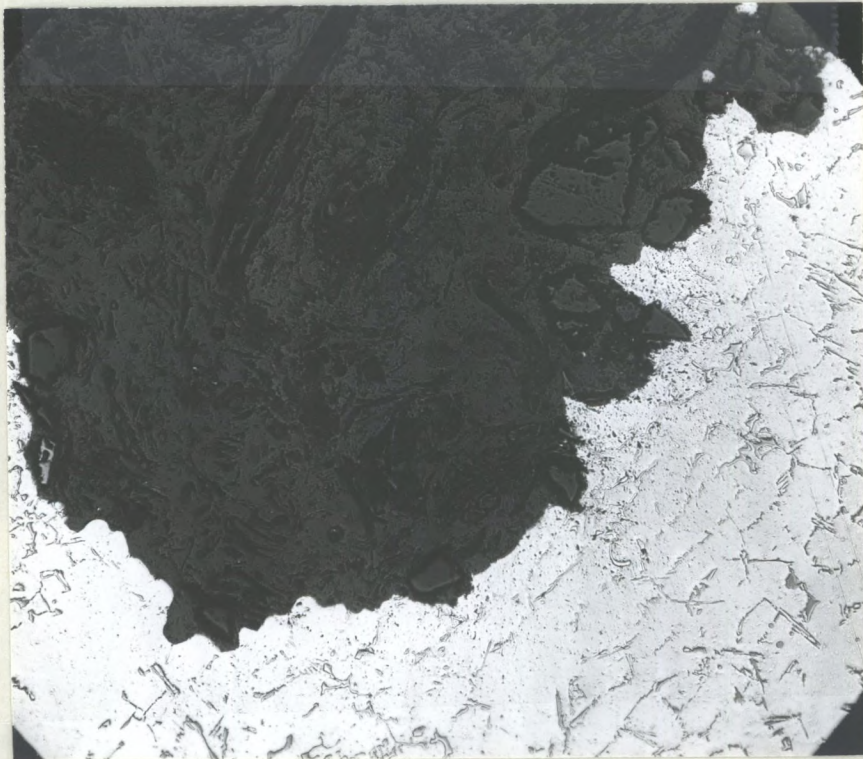
Figure 1.



X100, unetched.

INCLUSIONS IN ALUMINIUM-SILICON CASTING.

Figure 2.



X100, unetched.

SURFACE DEFECT IN ALUMINIUM-SILICON CASTING.

Conclusions:

The results of this examination would suggest that the inclusions were due to the pick-up of some non-metallic material, possibly pieces of the furnace lining.

The adherence of sand grains and the irregular shape of the cavity would support the explanation of Mr. Wm. Bond, Manager, Foundry Division, Ottawa Car and Aircraft Ltd., Ottawa, Ontario, that the surface defects were due to minute clay explosions at the surface of the mould.

oooooooooooo
oooooooooo
oo

JRS:LB.